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FOREST INSECT INVESTIGATIONS

Project | Date April 22, 1947 | Author

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SUBJECT—

TITLE

FOREST INSECT SURVEY
EASTERN LASSEN AND SUSANVILLE AREAS
LASSEN COUNTY, CALIFORNIA
SEASON OF 1946

By

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U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT INVESTIGATIONS

FOREST INSECT SURVEY

EASTERN LASSEN AND SUSANVILLE AREAS

LASSEN COUNTY, CALIFORNIA

SEASON OF 1946

Approved by:

F. P. Keen

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April 22, 1947

FOREST INSECT SURVEY
EASTERN LASSEN AND SUSANVILLE AREAS
LASSEN COUNTY, CALIFORNIA
SEASON OF 1946

INTRODUCTION

Annual surveys of forest insect conditions have been made since 1930 in the Eastern Lassen Area and since 1941 in the Susanville Area (see map). Their purpose has been to locate and determine the status of forest insect pests so that information on the kind and amount of damage and recommendations for necessary control could be made available to the forest land managing agencies. Results of the surveys have been reported each year with the exception of those made in 1944 and 1945. Though the surveys were made, no reports were issued for these two years because of the shortage of personnel occasioned by the war and the need for similar reports in other parts of California where the forest insect situation was more critical. Consequently, while the present report deals mainly with the findings of the 1946 survey, it also includes statistics on pine losses for the years not reported.

The loss statistics presented in the report are those for the calendar years 1943, 1944 and 1945. Losses for the calendar year 1946 were not all evident when the survey was made and these cannot be reported upon fully until next year. A more or less qualitative discussion of the 1946 infestations is included in the report, however.

HOW THE SURVEY WAS MADE

Time: September 24 to October 14, 1946, inclusive.

Personnel: The writer, assisted by Assistant Forester Charles A. Swanson of the Lassen National Forest staff.

Methods: General reconnaissance of the forested area from roads and fire lookout stations coupled with 100 per cent mortality cruises of 25 permanent roadside sample plots totalling 3,420 acres, or approximately 1 percent of the virgin pine timbered acreage.

Area Covered: The survey was concentrated upon the 351,000 acres of virgin pine timbered acreage in the Eastern Lassen and Susanville Areas outlined on the accompanying map. A rather cursory examination of forest insect conditions was also made on the 202,000 acres of pine cutover lands lying in the two reporting areas.

RESULTS OF THE SURVEY

Important Forest Insect Problems Revealed By the Survey

The drain of pine timber resources from infestations of bark beetles constitutes the only current insect problem of importance. It exists in all

parts of the two reporting areas, chiefly in the virgin stands and to a lesser degree in cutover reserve stands.

Insects Responsible For Pine Damage, 1943-1946

Western pine beetle, Dendroctonus brevicomis Lec., and the Oregon pine engraver beetle, Ips oregoni Eich., in ponderosa pine and the Jeffrey pine beetle, D. jeffreyi Hopk., in Jeffrey pine.

Character of Bark Beetle Infestations, 1943-1946

Infestations of both the western and Jeffrey pine bark beetles have been at a low ebb during most of this period. The tree selection trait of both insects seems to have been strongly exhibited inasmuch as their attacks were confined largely to mature and overmature decadent trees of relatively high insect risk or to those which had suffered superficial damage from lightning, wind or fire. The infested trees occurred singly at fairly wide intervals throughout the stands.

Beginning in 1945 and continuing through 1946, the infestations became more aggressive and, though the same types of trees were infested, they became more numerous in the stands. Southeast of Eagle Lake the infestation was complicated by an outbreak of the Oregon pine engraver beetle which developed in slashings left by a logging operation. Large groups of pole-sized trees were killed in an area covering several thousands acres on the divide between Eagle Lake and Willow Creek, but damage decreased during 1946 and the infestation appeared to be on the wane.

A very considerable part of the beetle-caused pine mortality which occurred in 1945 was made up of trees which had been severely damaged by lightning earlier that year. Electrical storms of unusual intensity during the spring and early summer resulted in many lightning-struck trees, including low risk dominant trees, which were soon attacked almost without exception by the succeeding flight of beetles.

Trend of Bark Beetle Infestations

The trend of bark beetle damage has declined generally since the last beetle epidemic which peaked in 1934 (Figure 1). A low point was apparently reached in the Eastern Lassen country in 1944 and since then the damage has increased. Initial measurements of the 1946 damage indicate that the upward trend which became evident in 1945 will continue through 1946 at least. It cannot be determined yet whether this is the forerunner of another period of epidemic losses though the current deficiency of precipitation in the two reporting areas supports this contention.

Insect Damage on Sample Plots, 1943-1945

Bark beetles were responsible for practically all the pine damage which occurred on the sample plots during this three year period. The aggregate

beetle-caused pine mortality measured on the plots during 1943, 1944 and 1945 is given in Table 1. This table also includes an estimate of the plot mortality for 1946 obtained by applying a correction factor to the partial calendar year's mortality measurable at the time of the survey.

Table 1. Pine Timber Killed By Bark Beetles on Virgin Sample Plots 1943 - 1945

EASTERN LASSEN AND SUSANVILLE AREAS

YEAR	Net Plot Acreage	Tree SPP	PINE STAND Volume M.b.m.	TIMBER KILLED No. of Trees	Volume (b.m.)	Volume Per Acre	% of Stand
1943	4,080	PP	34,120	47	70,600	17.3	0.2
		JP	18,550	23	33,360	8.2	0.2
		SP	400	none	none	none	none
		Total	53,070	70	130,960	25.5	0.2
1944	3,664	PP	28,790	56	71,230	19.4	0.2
		JP	17,080	13	14,080	3.8	0.1
		SP	400	none	none	none	none
		Total	46,270	69	85,310	23.2	0.2
1945	3,664	PP	28,790	128	172,176	47.0	0.6
		JP	17,080	21	22,750	6.2	0.1
		SP	400	none	none	none	none
		Total	46,270	149	194,926	53.2	0.4

This tabulation shows that Jeffrey pine losses have been less severe than ponderosa pine losses when the occurrence of these two tree species in the stands is considered.

The individual plot mortality records for each of the three years is not included here because of their bulk, but they indicate in 1943 and 1944 that the rate of mortality was fairly uniform in all sections of the two reporting areas. In 1945 they show that, while the mortality rate was up in most sections, it increased rather alarmingly in several localities; namely, Dixie Valley Unit, in a broad belt extending from Nigger Spring to Halls Flat and from there along the south slope of Blacks, Patterson and Harvey Mountains to the west slope of Crater Mountain, and, finally, the timbered slopes leading down to the south and west shore of Eagle Lake (see map).

Estimated Bark Beetle Damage in Virgin Pine Stands, 1943-1945

Approximately 30,000 ponderosa and Jeffrey pine trees containing nearly 35,000,000 board feet, or 0.8 percent of the pine stand, were killed by bark beetles during this three-year period (Table 2). The distribution

of this loss by years and by entomological units is given in the appendix in Tables 3, 4 and 5. These losses were distributed throughout the two

Table 2. Estimated Virgin Pine Timber Killed By Bark Beetles During 1943, 1944 and 1945. Eastern Lassen and Susanville Areas, Lassen County, California

YEAR	VIRGIN PINE STAND			TIMBER KILLED			
	Net Acreage	Tree SPP	Volume M.b.m.	No. of Trees	Volume M.b.m.	Volume Per Acre	% of Stand
1943	393,880*	PP	3,365,420	5,440	7,300	18.5	0.2
		JP	1,408,850	2,440	2,910	7.4	0.2
		SP	33,150	none	none	none	none
		PP + JP + SP	4,807,420	7,840	10,210	26.4	0.2
1944	350,910**	PP	2,926,760	5,830	6,260	17.8	0.2
		JP	1,684,130	980	960	2.7	0.1
		SP	31,910	none	none	none	none
		PP + JP + SP	4,642,800	6,810	7,220	20.5	0.2
1945	350,910**	PP	2,926,760	12,880	15,400	43.9	0.5
		JP	1,684,130	2,170	2,070	5.9	0.1
		SP	31,910	none	none	none	none
		PP + JP + SP	4,642,800	15,050	17,470	49.8	0.4

* As of January 1, 1943
** As of January 1, 1946

reporting areas during 1943 and 1944 in much the same manner as indicated by the plot mortality records described above. An attempt has been made to show the relative severity of mortality during 1945 by the use of colored symbols on the map. In most cases, this has been based upon the board foot per acre loss as well as the percent of pine stand lost which usually are directly proportional. In one or two instances, however, they are not and a comparatively small volume per acre mortality has represented a considerable percentage of the stand, as was the case in the Brockman Flat Unit.

Bark Beetle Damage in 1946

The complete 1946 beetle-caused pine mortality had not yet appeared when the survey was made and thus no attempt has been made to make quantitative estimates on the various units. From such measurements as were obtained from the sample plots it seems that the more aggressive infestations which characterized the 1945 season will carry through the 1946 season. Heaviest mortality in 1946 was observed along the base of the west slope of Crater Mountain, in the Bogard Buttes country adjoining the northeast boundary of Lassen Volcanic National Park, in the vicinity of Stanford Troughs,

Gooch Valley and Cleghorn Reservoir. While the quantitative estimates of the 1946 mortality cannot be said to be indicative of epidemic conditions, the rapid acceleration of insect activity in these areas bears watching.

It is believed the 1946 bark beetle activity was stimulated at least in two places in the Eastern Lassen Area by damage to the pine stands due to wind and fire. In the Butte Creek country west of Bogard Buttes a severe wind storm unearthed a large number of trees early in the spring of 1946. Many of these trees, both ponderosa and Jeffrey pine, were reserve trees left from the Red River Lumber Company timber sale made a few years ago. In the Dixie Valley Unit right-of-way clearing fires along the new timber access road apparently burned hotter than expected with the result that green timber was scorched or otherwise damaged by heat. Many of these trees were infested, as were the windfalls at Butte Creek, by early 1946 summer generations of the western and Jeffrey pine beetles and by the Oregon pine engraver beetle. Under certain conditions beetle populations which develop successfully in this kind of material might easily form the nucleus of serious infestations in the surrounding green timber, though it is not known yet to what extent this may have happened in these two cases.

Current Bark Beetle Damage in Cutover Reserve Stands.

Except in one instance, no attempt was made in the 1946 survey to make any but the most superficial examinations of insect conditions in pine cutover reserve stands. No abnormal insect-caused damage was noted.

In the Willard Creek Unit a special examination was made to ascertain what insect damage had occurred following the application by the Forest Service in 1944, 1945 and 1946 of a light sanitation-salvage cutting on approximately 12,000 acres. The cutting removed only slightly more than an average of 32 percent of the pine stand mainly in high insect risk trees. A 128-acre sample plot established in the area in 1941 shows the following pre-cutting and post-cutting beetle mortality:

Year	Pine Mortality
1941	40.0 bd. ft. per acre
1942	113.9 " " " "
1943	22.6 " " " "
	Sanitation-salvage Cutting
1944	0.5 " " " "
1945	9.3 " " " "

Insect Control Recommendations

While the present high endemic infestations in the Eastern Lassen and Susanville Areas do not warrant direct (cut-peel-burn) control, it is

obvious that some measure of control is needed to forestall further virgin pine mortality from beetles which, even at minimum natural levels, has been averaging better than 10 million board feet per year. It appears inconceivable that the rate of mortality for the next few years will be any less than it has in the last three or four years because of the inherent beetle hazard of the virgin pine stands.

The Forest Insect Hazard Inventory of these two reporting areas, completed by this laboratory in 1937 1/, points out that about 75 percent of the virgin pine acreage, then covering some 500,000 acres, was of moderate to high beetle hazard. Though intervening cuttings have reduced their acreage they have not materially altered the hazard of the present stands. The need of beetle protection is just as great today as it was in 1937.

It seems almost certain that the utilization of the virgin stands, because of its magnitude, cannot be completed for some years to come. These stands, then, should be bug-proofed to prevent not only the further loss of stumpage from endemic infestations but the buildup of epidemic infestations. This can be accomplished by the early application of sanitation-salvage cuttings to as much of the virgin pine acreage as possible. The high beetle risk trees would then be cut and milled while at their maximum economic value and before they could be attacked by insects and serve as a focal point for further infestations. Such high risk trees today make up from 15 to 25 percent of the virgin pine volume to which might be added certain other types of trees as a means of increasing the volume cut to meet special objectives.

The selection of individual areas for this treatment largely depends upon logging opportunities, the value of the timber to be protected and the management objectives -- things which each timberland owner must decide for himself.

In absence of this treatment a continuation of beetle-caused timber drain may be expected to reduce further the already limited supply of virgin timber, to reduce the ultimate harvest value of the present stands and to shorten that part of the economic life of the eastern Lassen country dependent upon the growing and harvesting of timber.

1/ Bark beetle hazards in the pine stands of northeastern California. Forest Insect Laboratory, Berkeley, California. May 1941. Processed. Parts I and II.

APPENDIX

Table 3. Estimated virgin pine timber killed by bark beetles in 1943

EASTERN LASSEN AREA

ENTOMOLOGICAL UNIT	VIRGIN PINE STAND (January 1, 1943)			PINE TIMBER KILLED IN 1943			
				No. of	Volume		
	Acreage	Spp	M.b.m.	Trees	M.b.m.	b.m./ac.	% Stand
Coble Mtn.	20,490	PP	105,750	470	350	17.1	0.3
		JP	11,010	40	70	3.5	0.6
Dixie Valley	17,450	PP	86,730	120	20	0.9	0.1-
		JP	41,760	120	340	19.6	0.8
Nigger Spring	14,830	PP	73,110	60	60	4.2	0.1
		JP	86,320	280	340	23.2	0.4
Beaver Creek	21,150	PP	138,370	110	180	8.6	0.1
		JP	53,600	110	160	7.8	0.3
Straylor Lake	25,970	PP	181,860	340	260	9.9	0.1
		JP	89,240	340	450	17.2	0.5
Gordon Lake	34,210	PP	322,220	890	1,060	31.0	0.3
		JP	124,770	310	20	0.7	0.1-
Butte Creek	27,260	PP	226,660	250	270	9.8	0.1
		JP	182,460	none	none	none	none
Halls Flat	11,320	PP	17,300	none	none	none	none
		JP	76,210	180	320	28.5	0.4
Blacks Mtn.	24,210	PP	277,270	290	430	17.7	0.2
		JP	104,780	50	70	2.9	0.1
Harvey Valley	16,040	PP	197,340	420	490	30.8	0.2
		JP	28,890	none	none	none	none
Cave Mtn.	12,970	PP	115,860	740	450	34.8	0.4
		JP	31,290	none	none	none	none
Bogard Buttes	24,890	PP	281,180	250	870	35.1	0.3
		JP	118,470	200	260	10.6	0.2
Stephens Ranch	27,760	PP	405,150	80	540	19.3	0.1
		JP	12,440	none	none	none	none
Crater Mtn.	10,050	PP	137,720	200	420	41.9	0.3
		JP	24,060	none	none	none	none
Logan Mtn.	1,120	PP	11,590	10	30	27.9	0.3
		JP	10,050	none	none	none	none

Table 3 (Continued)

ENTOMOLOGICAL UNIT	VIRGIN PINE STAND (January 1, 1943) Acreage	Spp	M.b.m.	PINE TIMBER KILLED IN 1943 No. of Trees	Volume M.b.m.	b.m./ac.	% Stand
EASTERN LASSEN AREA							
Campbell Butte	7,720	PP	79,140	100	220	27.9	0.3
		JP	17,320	none	none	none	none
Merrill Flat	17,650	PP	187,180	390	550	31.4	0.3
		JP	47,780	110	200	11.2	0.4
		SP	33,150	none	none	none	none
Brockman Flat	10,590	PP	6,070	70	60	5.7	1.0
		JP	23,570	30	50	4.8	0.2
AREA SUBTOTALS	325,680	PP	2,850,500	4,790	6,260	19.2	0.2
		JP	1,084,020	1,770	2,280	7.0	0.2
		SP	33,150	none	none	none	none
SUSANVILLE AREA							
Robbers Creek	9,830	PP	12,340	10	60	6.1	0.5
		JP	135,050	none	none	none	none
Susan River	8,120	PP	82,100	50	100	12.2	0.1
		JP	27,070	110	80	10.4	0.3
Willard Creek	15,360	PP	86,950	140	280	18.3	0.3
		JP	91,690	310	240	15.6	0.3
Piute Creek	14,640	PP	144,830	190	250	17.4	0.2
		JP	36,500	90	130	9.1	0.4
Merrillville	20,250	PP	188,700	260	350	17.4	0.2
		JP	34,520	120	180	9.1	0.5
AREA SUBTOTALS	68,200	PP	514,920	650	1,040	15.2	0.2
		JP	324,830	630	630	9.2	0.2
EASTERN LASSEN AND SUSANVILLE AREAS							
TOTALS OF	393,880	PP	3,365,420	5,440	7,300	18.5	0.2
		JP	1,408,850	2,400	2,910	7.4	0.2
		SP	33,150	none	none	none	none
	PP + JP + SP		4,807,420	7,840	10,210	26.4	0.2

Table 4. Estimated virgin pine timber killed by bark beetles in 1944

EASTERN LASSEN AREA

ENTOMOLOGICAL UNIT	VIRGIN PINE STAND (January 1, 1946)			PINE TIMBER KILLED IN 1944			
				No. of	Volume		
	Acreage	Spp	M.b.m.	Trees	M.b.m.	b.m./ac.	% Stand
Coble Mtn.	20,490	PP	105,750	470	330	16.3	0.3
		JP	11,010	none	none	none	none
Dixie Valley	17,250	PP	85,730	290	350	20.1	0.4
		JP	41,280	none	none	none	none
Nigger Spring	14,830	PP	73,110	340	310	21.1	0.4
		JP	86,320	none	none	none	none
Beaver Creek	19,930	PP	90,960	780	280	13.8	0.3
		JP	51,240	none	none	none	none
Straylor Lake	16,860	PP	110,050	420	400	24.0	0.4
		JP	57,200	none	none	none	none
Gordon Valley	31,040	PP	290,350	590	300	9.8	1.0
		JP	530,480	none	none	none	none
Butte Creek	26,620	PP	221,340	290	710	26.6	0.3
		JP	178,180	none	none	none	none
Halls Flat	11,280	PP	17,240	20	110	9.6	0.6
		JP	75,940	50	30	2.5	0.1
Blacks Mtn.	22,160	PP	253,800	310	500	22.4	0.2
		JP	95,910	40	50	2.2	0.1
Harvey Valley	13,760	PP	171,080	180	190	13.6	0.1
		JP	24,360	none	none	none	none
Cave Mtn..	11,640	PP	104,600	150	70	6.2	0.1
		JP	27,620	none	none	none	none
Bogard Buttes	20,380	PP	230,230	260	250	12.5	0.1
		JP	97,010	220	550	26.9	0.6
Stephens Ranch	26,600	PP	388,220	350	350	13.1	0.1
		JP	11,920	none	none	none	none
Crater Mtn.	9,540	PP	130,730	210	550	57.5	0.4
		JP	22,840	none	none	none	none
Logan Mtn.	1,120	PP	11,590	10	10	10.8	0.1
		JP	10,050	none	none	none	none

Table 4 (Continued)

EASTERN LASSEN AREA

ENTOMOLOGICAL UNIT	VIRGIN PINE STAND (January 1, 1946) Acreage	Spp	M.b.m.	PINE TIMBER KILLED IN 1944 No. of Trees	Volume M.b.m.	b.m./ac.	% Stand
Campbell Butte	4,650	PP	47,670	30	100	21.6	0.2
		JP	10,430	none	none	none	none
	16,960	PP	180,070	250	280	16.4	0.2
		JP	45,850	none	none	none	none
		SP	31,910	none	none	none	none
Brockman Flat	10,590	PP	6,070	200	140	13.6	2.3
		JP	23,570	none	none	none	none
AREA SUBTOTALS	295,700	PP	2,518,590	5,150	5,230	17.7	0.2
		JP	1,401,210	310	630	2.1	0.1
		SP	31,910	none	none	none	none

SUSANVILLE AREA

Robbers Creek	8,910	PP	4,640	50	60	6.5	1.3
		JP	135,050	none	none	none	none
Susan River	6,890	PP	67,690	90	170	24.6	0.3
		JP	24,970	70	20	2.0	0.1
Willard Creek	11,780	PP	68,560	220	320	27.5	none
		JP	70,490	220	50	3.9	0.1
Piute Creek	11,570	PP	114,170	220	320	27.5	0.3
		JP	24,060	220	50	3.9	0.2
Merrillville	16,060	PP	153,110	100	160	10.0	0.1
		JP	28,350	160	210	13.0	0.7
AREA SUBTOTALS	55,210	PP	408,170	680	1,030	18.7	0.3
		JP	282,920	670	330	6.0	0.1

EASTERN LASSEN AND SUSANVILLE AREAS

TOTALS OF ABOVE TWO	350,910	PP	2,926,760	5,830	6,260	17.8	0.2
		J P	1,684,130	980	960	2.7	0.1
		SP	31,910	none	none	none	none
		PP + JP + SP	4,642,800	6,810	7,220	20.5	0.2

Table 5. Estimated virgin pine timber killed by bark beetles in 1945

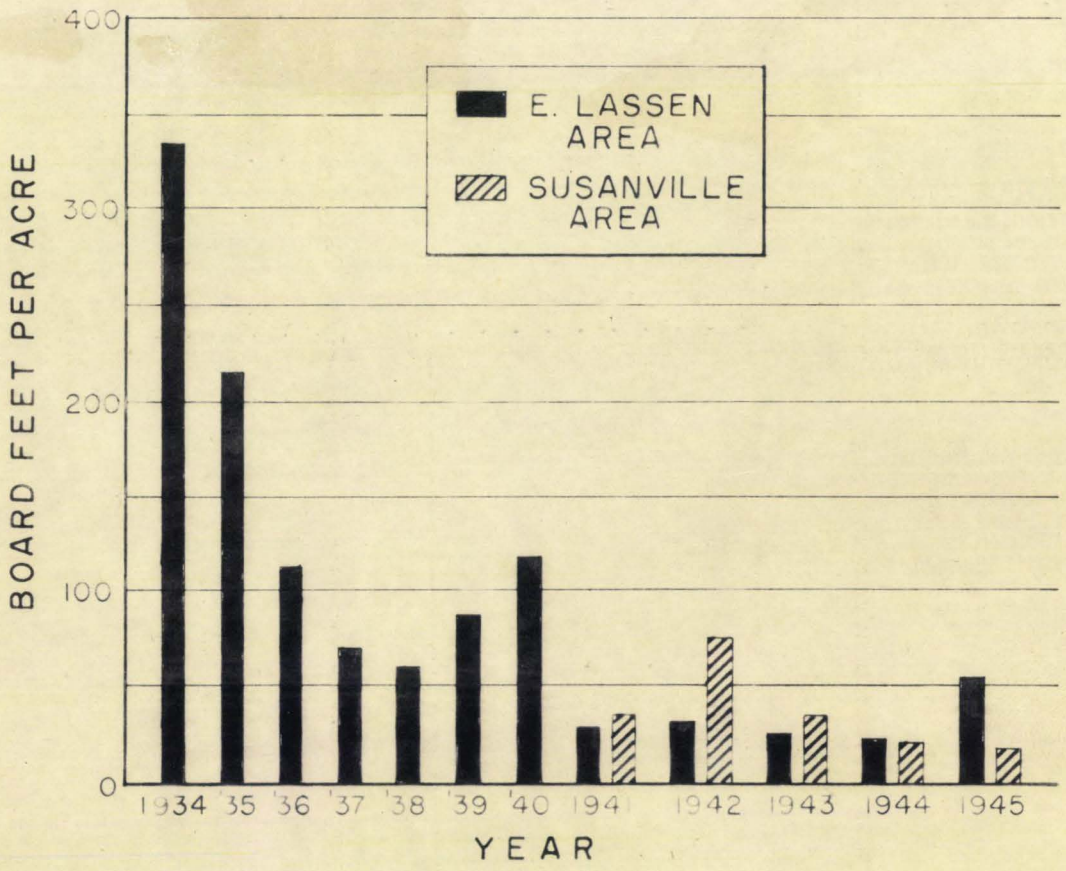
EASTERN LASSEN AREA

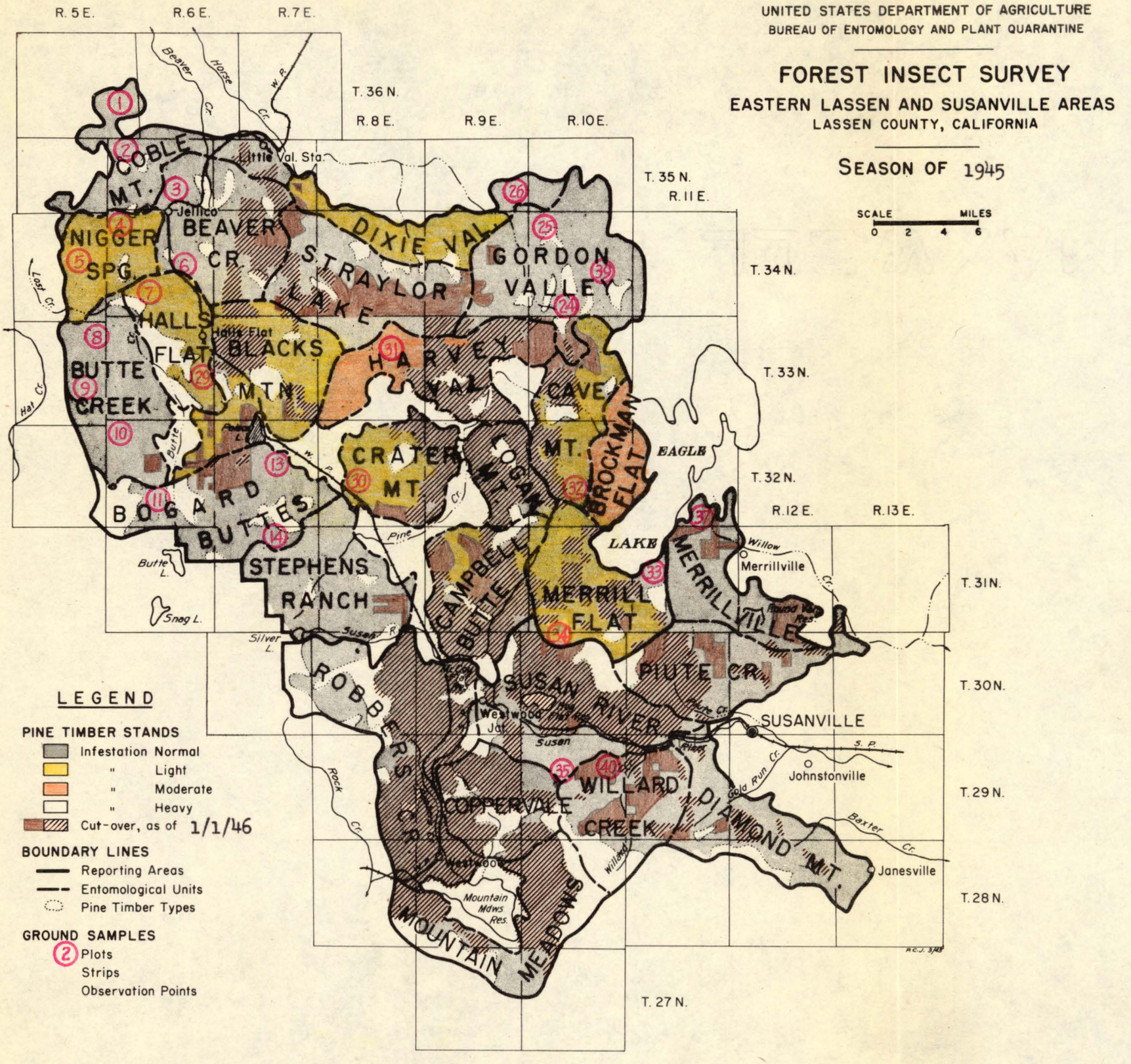
ENTOMOLOGICAL UNIT	VIRGIN PINE STAND (January 1, 1946)			PINE TIMBER KILLED IN 1945			
				No. of	Volume		
	Acreage	Spp	M.b.m.	Trees	M.b.m.	b.m./ac.	% Stand
Coble Mtn.	20,490	PP	105,750	720	340	16.7	0.3
		JP	11,010	none	none	none	none
Dixie Valley	17,250	PP	85,730	590	980	56.7	1.1
		JP	41,280	none	none	none	none
Nigger Spring	14,830	PP	73,110	340	580	38.9	0.8
		JP	86,320	90	120	8.0	0.1
Beaver Creek	19,930	PP	90,960	320	500	25.3	0.5
		JP	51,240	320	170	8.6	0.3
Straylor Lake	16,860	PP	110,050	420	680	40.0	0.6
		JP	57,200	none	none	none	none
Gordon Valley	31,040	PP	290,350	530	750	24.2	0.3
		JP	530,480	none	none	none	none
Butte Creek	26,620	PP	221,340	850	1,180	44.5	0.5
		JP	178,180	340	340	12.8	0.2
Halls Flat	11,280	PP	17,240	190	270	23.7	1.6
		JP	75,940	20	40	3.3	0.1
Blacks Mtn.	22,160	PP	253,800	1,710	1,550	69.8	0.6
		JP	95,910	110	260	11.7	0.3
Harvey Valley	13,760	PP	171,080	1,110	1,670	121.6	1.0
		JP	24,360	180	520	37.8	2.1
Dave Mtn.	11,640	PP	104,600	1,090	1,100	94.3	1.1
		JP	27,620	150	100	8.7	0.4
Bogard Buttes	20,380	PP	230,230	390	670	33.1	0.3
		JP	97,010	220	20	1.0	0.1
Stephens Ranch	26,600	PP	388,220	160	730	27.6	0.2
		JP	11,920	none	none	none	none
Crater Mtn.	9,540	PP	130,730	750	1,210	127.0	0.9
		JP	22,840	none	none	none	none
Logan Mtn.	1,120	PP	11,590	20	20	21.5	0.2
		JP	10,050	none	none	none	none
Campbell Butte	4,650	PP	47,670	180	290	63.0	0.6
		JP	10,430	none	none	none	none

Table 5 (Continued)

5?

ENTOMOLOGICAL UNIT	VIRGIN PINE STAND (January 1, 1946) Acreage	Spp	M.b.m.	PINE TIMBER KILLED IN 1944 No. of Trees	Volume M.b.m.	b.m./ac.	% Stand
EASTERN LASSEN AREA							
Merrill Flat	16,960	PP	180,070	1,240	1,310	77.2	0.1
		JP	45,850	70	50	2.9	0.1
		SP	31,910	none	none	none	none
Brockman Flat	10,590	PP	6,070	440	210	20.0	3.5
		JP	23,570	60	50	4.4	0.2
AREA SUBTOTALS	295,700	PP	2,518,590	11,050	14,040	47.5	0.6
		JP	1,401,210	1,560	1,670	5.6	0.1
		SP	31,910	none	none	none	none
SUSANVILLE AREA							
Hobbers Creek	8,190	PP	4,640	70	90	10.0	1.9
		JP	135,050	none	none	none	none
Susan River	6,890	PP	67,690	130	220	31.5	0.3
		JP	24,970	40	10	1.8	0.1
Willard Creek	11,780	PP	68,560	none	none	none	none
		JP	70,490	150	40	3.6	0.1
Piute Creek	11,570	PP	114,170	680	440	37.9	0.4
		JP	24,060	160	150	12.6	0.6
Merrillville	16,060	PP	153,110	950	610	37.9	0.4
		JP	28,350	260	200	12.6	0.7
AREA SUBTOTALS	55,210	PP	408,170	1,830	1,360	24.6	0.3
		JP	282,920	610	400	7.2	0.1
EASTERN LASSEN AND SUSANVILLE AREAS							
TOTALS OF ABOVE TWO AREAS	350,910	PP	2,926,760	12,880	15,400	43.9	0.5
		JP	1,684,130	2,170	2,070	5.9	0.1
		SP	31,910	none	none	none	none
	PP + JP + SP		4,642,800	15,050	17,470	49.8	0.4


400
300
200
100
0
BOARD FEET PER ACRE
E. LASSEN AREA
SUSANVILLE AREA
1934
'35
'36
'37
'38
'39
'40
1941
1942
1943
1944
1945
YEAR


UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
FOREST INSECT SURVEY
EASTERN LASSEN AND SUSANVILLE AREAS
LASSEN COUNTY, CALIFORNIA
SEASON OF 1945
SCALE MILES
0 2 4 6
R. 5 E.
R. 6 E.
R. 7 E.
R. 8 E.
R. 9 E.
R. 10 E.
R. 11 E.
R. 12 E.
R. 13 E.
T. 36 N.
T. 35 N.
T. 34 N.
T. 33 N.
T. 32 N.
T. 31 N.
T. 30 N.
T. 29 N.
T. 28 N.
T. 27 N.
COBLE MT.
NIGGER SPG.
BEAVER CR.
DIXIE VAL.
STRAYLOR LAKE
GORDON VALLEY
HALLS FLAT
BLACKS MTN.
HARVEY VAL.
CAVE MT.
BROCKMAN FLAT
EAGLE LAKE
BUTTE CREEK
BOGARD BUTTES
CRATER MT.
COAL BUTTE
CAMPBELL BUTTE
STEPHENS RANCH
MERRILL FLAT
MERRILLVILLE
ROBBERS CR.
SUSAN RIVER
PIUTE CR.
COPPERVALE
WILLARD CREEK
DIAMOND MT.
MOUNTAIN MEADOWS
Little Val. Sta.
Jellico
Halls Flat
Merrillville
Westwood
SUSANVILLE
Johnstonville
Janesville
Beaver Cr.
Horse Cr.
W. P.
Lost Cr.
Hat Cr.
Butte Cr.
Butte L.
Snag L.
Pine Cr.
Silver L.
Susan R.
Willow Cr.
Round Valley Res.
Gold Run Cr.
Baxter Cr.
Rock Cr.
Willard Cr.
Mountain Mdws. Res.
S. P.
LEGEND
PINE TIMBER STANDS
Infestation Normal
" Light
" Moderate
" Heavy
Cut-over, as of 1/1/46
BOUNDARY LINES
Reporting Areas
Entomological Units
Pine Timber Types
GROUND SAMPLES
Plots
Strips
Observation Points